



**DISCOVER MONTANA'S  
ECOSYSTEMS!**

# Discover Montana's Ecosystems

## Teacher's Guide

[fwp.mt.gov/education/ecosystem](http://fwp.mt.gov/education/ecosystem)

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## Who the site is for

This website is designed for K-12 educators. It is an electronic ecosystem learning module designed to facilitate understanding about Montana's plants and animals through standards-based design. It is specifically directed to the 4-7<sup>th</sup> grade student, however, teachers can adapt it for their specific grade level. It will also serve as a resource for prospective K-12 teachers enrolled in higher education Teacher Education programs.

## Standards the site teaches

### Montana Science Standards (OPI 2006)

#### Standard 1

Students, through the inquiry process, demonstrate the ability to design, conduct, evaluate, and communicate the results and form reasonable conclusions of scientific investigations.

#### Standard 3

Students, through the inquiry process, demonstrate knowledge of characteristics, structures and function of living things, the process and diversity of life, and how living organisms interact with each other and their environment.

By the end of 4th grade, students will be able to:

Benchmark 1. identify that plants and animals have structures and systems that serve different functions for growth, survival, and reproduction;

Benchmark 3. describe and use models that trace the life cycles of different plants and animals and discuss how they differ from species to species;

Benchmark 4. explain cause and effect relationships between nonliving and living components within ecosystems; and explain individual response to the changes in the environment including identifying differences between inherited, instinctual, and learned behaviors;

Benchmark 5. create and use a classification system to group a variety of plants and animals according to their similarities and differences.

By the end of 8th grade, students will be able to:

Benchmark 2. explain how organisms and systems of organisms obtain and use energy resources to maintain stable conditions (e.g., food webs, photosynthesis, respiration);

Benchmark 4. investigate and explain the interdependent nature of populations and communities in the environment and describe how species in these populations adapt by evolving;

Benchmark 5. create and use a basic classification scheme to identify plants and animals.

## Navigating the site

### Ambassadors



#### Montane Forest

Black bears are true creatures of the forested mountains. Their short curved front claws make them excellent climbers and their omnivorous diet allows them to feed on a variety of plants and animals. Black bears are an excellent ambassador for the Montane ecosystem.



#### Intermountain Grassland

The Western toad thrives in moist habitats throughout the intermountain grasslands. The ability of these toads to survive in areas with short summers makes them excellent ambassadors for the ecosystem.



#### Shrub Grassland

The sage grouse is truly adapted to a sagebrush habitat. As a native bird that doesn't migrate, the sage grouse survives by depending on sagebrush for food and shelter from Montana's harsh winters. This connection to the shrub grasslands makes this animal an excellent ambassador for this ecosystem.





#### Plains Grassland

Pronghorn antelope are only native to North America's Great Plains. They are true animals of the prairie as their excellent sight and speed makes them difficult prey for predators. The pronghorn is an excellent ambassador for the Plains grassland and forest ecosystem.

## Site map

This website is more 2-dimensional than most. We cover 4 ecosystems (Montane Forest, Plains Grassland, Intermountain Grassland, and Shrub Grassland). We also have a “Home” area that covers more general information about our ecosystems. For each ecosystem, and Home, there are 5 areas of information: Discover, Explore, Conserve, Learn, and Resources.

Splash Movie	Discover	Explore	Conserve	Learn	Resources
 Home	General information about the site, What are Ecosystems?, and Glossary	General information about FASs, WMAs, and State Parks as well as guides and tools to use in the field	Conserving Species and Communities.	General information about interactive activities	General resources
 Montane Forest	Facts about Montane Forest fish & wildlife, and plants (including photos)	FWP lands you can visit in the Montane Forest	People doing good work, Focus Areas, and Species in the Most Need of Conservation for the Montana Forest.	Interactive Activities pertinent to the Montane Forest	Resources specific to the Montane Forest
 Intermountain Grassland	Facts about Intermountain Grassland fish & wildlife, and plants (including photos)	FWP lands you can visit in the Intermountain Grassland	People doing good work, Focus Areas, and Species in the Most Need of Conservation for the Intermountain Grassland.	Interactive Activities pertinent to the Intermountain Grassland	Resources specific to the Intermountain Grassland
 Shrub Grassland	Facts about Shrub Grassland fish & wildlife, and plants (including photos)	FWP lands you can visit in the Shrub Grassland	People doing good work, Focus Areas, and Species in the Most Need of Conservation for the Shrub Grassland.	Interactive Activities pertinent to the Shrub Grassland	Resources specific to the Shrub Grassland
 Plains Grassland	Facts about Plains Grassland fish & wildlife, and plants (including photos)	FWP lands you can visit in the Plains Grassland	People doing good work, Focus Areas, and Species in the Most Need of Conservation for the Plains Grassland.	Interactive Activities pertinent to the Plains Grassland	Resources specific to the Plains Grassland

## 5 Areas of Information

Each ecosystem has the following content:

### Discover

Learn about the physical characteristics of the ecosystem and about the plants and animals of the ecosystem.

### Explore

This page directs learners to FWP sites that can be used as wild classrooms for students to learn about natural areas near them.

### Conserve

This page discusses the good work being done to conserve our fish and wildlife resources. It also presents information about habitats and species in most need of conservation.

### Learn

Each Learn page consists of a tutorial including a content page, interactive activity, and a quiz to test their knowledge.

### Resources

This page lists additional resources such as articles from Montana Outdoors magazine, FWP's video outdoor reports, and other related web sites.

## Tools available on the site

### Searches

There are several ways to search for FWP lands from the Ecosystems site.

## Ecosystems

Go to any ecosystem by clicking on the map on the Home landing page.

Home » Education » Discover Montana's Ecosystems » Ecosystem Education Landing page

Discover Montana's Ecosystems

Discover Explore Conserve Learn Resources Change Ecosystem

### We invite you to Discover...

**M**ontana's ecosystems! Everyone has a special natural place. To some of us it is our backyard and to others it's a favorite hunting, snowmobiling, camping, or fishing site. Join us on a natural adventure through Montana's amazing ecosystems.

Click on the map to go to the ecosystem where you live.

### Discover!

Montana is huge! It is our nation's fourth-largest state. Not only big but rich in wildlife, it supports more than 600 species of fish, mammals, birds, reptiles, and amphibians. Why so many? Because Montana offers an awesome variety of places for animals to live.

#### Ecosystem Key

##### Ecosystem Ambassadors

- All Ecosystems
- Montane Forest
- Intermountain Grassland
- Shrub Grassland
- Plains Grassland

##### Site Tools

- Ecosystems Glossary
- Site Map
- Field Toolkit

##### Using the Site

- Teacher's Guide



## All FWP Lands

Most pages have a map in the upper right corner that shows the land area for that ecosystem. Click on this map to view a clickable map where you can find all FWP lands within 25-50 miles of the location you click. You may also use pull downs to select the city and type of land they want. Results are sorted by ecosystem, and then land type.



# DISCOVER MONTANA'S EcoSYSTEMS!

Home » Education » Discover Montana's Ecosystems » Montane Forest » Discover

## Discover Montane Forest

Discover Explore Conserve Learn Resources

Change Ecosystem



Clark's Nutcracker

Photograph by Bob O'Leary


▶ Play  
|| Pause  
◀ Previous  
▶ Next  
👤 Play Movie



Click map to find areas to explore near you.

### Description

The montane forest ecosystem represents the mountains of Montana that have been formed by tectonic uplift and glacial erosion. These high elevation areas occur along the western third of the state and encompass mountains from their base to their summit with elevations increasing from the north where the Kootenai River flows into Idaho (1,800') southward to the snow capped peaks in the Beartooth Range (12,800') adjacent to Yellowstone National Park. Vast coniferous forest complexes of larch, fir, hemlock, pine, and spruce trees characterize these areas that protect the headwater mountain streams of Montana's rivers. Much of this ecosystem is in public ownership through the United States Forest Service (USFS).



### Montane Forest Statistics

Montane Forest:	26% of the state
Precipitation:	Averages 37 inches, mostly deposited in the winter
Soils:	Typically acidic
Topography:	- Mostly steep slopes, some more than 45 degrees - Elevation ranges from 1800' (lowest point in the state) to 12,800' (highest point in the state)



## Individual Land Search

There is a map on the Explore page for each ecosystem. Click on the icons on the map, or lower on the page, to visit the highlighted FWP lands. There are also links that will allow you to find all the WMAs, FAS, or State Parks in the specific ecosystem.



Home » Education » Discover Montana's Ecosystems » Montane Forest » Explore

### Explore Montane Forest

Discover Explore Conserve Learn Resources

Change Ecosystem

**E**xplore one of Montana Fish, Wildlife, & Park's Wildlife Management Areas (WMA), Fishing Access Sites (FAS), or State Parks in the montane forest. You can visit one of the sites we have highlighted or search for all of the lands in the montane forest.



WMA - Wildlife Management Area, FAS - Fishing Access Site

#### Judith River WMA

In 1940, the Judith River Wildlife Management Area (WMA) was Montana's first property to be purchased with sportsmen and women's dollars for the direct benefit of big game. The gently rolling slopes, ridges, fields, and benches of this...



## Glossary

You can hover over many words and get the definition right there. You can also look up words on the glossary page. The Glossary button is on the right side of the Home landing page.

## Field Toolkit

Tools the kids can use and take into the field to help them explore:

- Bird Guide
- Citizen Scientist forms
- Animal Field Guide - This guide provides information on identification, habitat, ecology, reproduction, range, and distribution of Montana's animal species of concern, along with references and photographs.

## Activities

### Citizen Scientists

This is a link to information from the Montana Heritage website on how to provide reports to aid scientist in identifying where species are found. Datasheets are attached. This link is found under the Toolkit (this button is on the right side of the Home landing page).

### Learn Games

These fun interactive activities focused on food chains, adaptations, and classification and human impacts on the environment help reinforce the concepts presented on this website. These games are found under the Learn page for each ecosystem.

### Scavenger Hunt

This hunt is a great way to get students to explore the site. Students will learn about the content on the site as they search for answers to the questions. The button is found on the right side of the Home landing page.

## Appendix A

### Scavenger Hunt Answers

1. What ecosystem do you live in?  
<http://fwp.mt.gov/education/ecosystem/home.html>  
Click on the Map to find your ecosystem
2. Name the state mammal and bird of Montana.  
Answer: Grizzly bear & Western meadowlark - photos on bottom of opening page  
<http://fwp.mt.gov/education/ecosystem/home.html>
3. When did the conservation achievement of removing bald eagles from the endangered species list occur?  
Answer: July 2007  
Go to Home Conserve  
<http://fwp.mt.gov/education/ecosystem/conserve.html>  
Then the box with the eagle picture  
<http://fwp.mt.gov/news/show.aspx?id=5698>
4. What percent of Montana's landscape is covered by montane forest?  
Answer: 26% of the state  
<http://fwp.mt.gov/education/ecosystem/montane/default.html>
5. How many inches of precipitation are needed before conifer forests will grow in the mountains?  
Answer: 20" of moisture  
<http://fwp.mt.gov/education/ecosystem/montane/default.html>
6. Name a mammal that eats porcupines?  
Answer: Fisher, American marten, mink, wolverine, mountain lion, lynx, and bobcats.  
<http://fwp.mt.gov/education/ecosystem/montane/animals.html>
7. What ecosystem includes the large expansive valleys between mountain ranges?  
Answer: Intermountain  
<http://fwp.mt.gov/education/ecosystem/intermountain/default.html>

8. The sage thrasher bird and common sagebrush lizard are found in which ecosystem?

Answer: Shrub grasslands

<http://fwp.mt.gov/education/ecosystem/shrub/animals.html>

9. Where do food chains get their energy?

Answer: The sun!

<http://fwp.mt.gov/education/ecosystem/learn.html>

10. How many focus areas in need of conservation are there in the intermountain grasslands?

Answer: 15 focus areas

<http://fwp.mt.gov/education/ecosystem/intermountain/focusAreas.aspx#species>

11. Which state park is featured on the shrub grasslands ecosystem Explore page?

Answer: Rosebud Battlefield

<http://fwp.mt.gov/education/ecosystem/shrub/explore.html>

12. What bird nests in dens underground?

Answer: Burrowing Owl

<http://fwp.mt.gov/education/ecosystem/plains/animals.html>

13. What percentage of the shrub grasslands can you find big sagebrush?

Answer: 65%

<http://fwp.mt.gov/education/ecosystem/shrub/plants.html>

14. Which turtle has a leathery soft shell?

Answer: Spiny softshell turtle

<http://fwp.mt.gov/education/ecosystem/plains/animals.html>

15. Name a prehistoric fish that can still be found living in the rivers of eastern Montana?

Answer: Paddlefish, pallid sturgeon, or shovelnosed sturgeon

<http://fwp.mt.gov/education/ecosystem/plains/animals.html>

## Appendix B

### Discover Montana's Ecosystems Evaluation

(Optional) Name:

School/grade:

Please help us to evaluate the usefulness of the information contained in the FWP Ecosystem website and also include any ideas that you may have for future improvements or additions.

	Not useful	Slightly useful	Helpful	Good Resource	Excellent Resource
Rate the overall value of this website as an instructional aid for teaching about Montana's fish and wildlife resources.	1	2	3	4	5
Rate the value of this site as an instructional tool to teach science standards.	1	2	3	4	5
Rate each part of the website:					
Discover	1	2	3	4	5
Explore	1	2	3	4	5
Conserve	1	2	3	4	5
Learn	1	2	3	4	5
Resources	1	2	3	4	5

Additional comments about the site:

Return to: FWP  
Ecosystem/ComEd  
PO Box 200701  
Helena MT 59620-0701